Highlights
Fisheries Resource Monitoring Program

Searching for a New Management Tool for Yukon River Chum Salmon

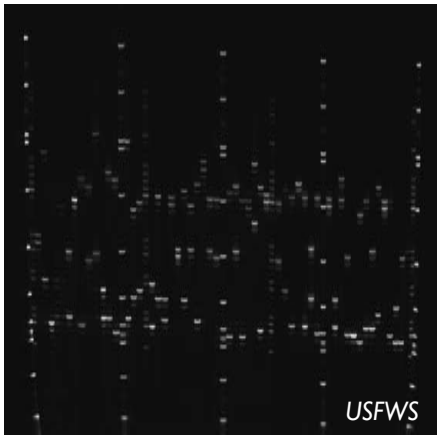

Image of DNA samples from chum salmon.

The management of chum salmon in the Yukon River drainage is complicated by the vastness of the river system, the inter-jurisdictional nature, and the number of populations that comprise the harvest in the main stem of the river. The Office of Subsistence Management, Fisheries Resource Monitoring Program is funding a project to learn if DNA analysis can aid in the management of Yukon River chum salmon.

Currently, managers base their decisions to open or close the Yukon fisheries on data from weirs, test fisheries, harvest reports, mark recapture projects, and sonar counts. If successful, the DNA analysis technique will provide more timely information and help managers meet harvest and conservation goals. It could also replace some of the current techniques, simplifying collection of the Yukon River chum fishery management data.

In this study, tissue samples are collected from fish in the main stem of the river at Pilot Station and genetically analyzed in-season. In previous work, genetic profiles were established for many of the key populations of chum salmon spawning in tributaries of the Yukon River. Through statistical analysis, the genetic profiles of the spawning populations are compared to the genetic profile of the tissue samples from Pilot Station to determine which populations are present and in what proportions. Fisheries managers can then be provided the genetic analysis results within 36 hours after the samples arrive at the lab. Post-season analyses are being conducted to compare these data with the data collected through the traditional methods to determine the applicability of the DNA analysis technique to management of Yukon River chum salmon.

DNA samples from chum salmon are loaded into a gel in a DNA sequencer for genetic analysis.

Chum salmon are a vital subsistence resource to communities along the 1,900-mile Yukon River, comprising approximately one-third of the subsistence salmon harvest on the river. When chum salmon failed to return in significant numbers from 1998 to 2002, it resulted in the restriction of subsistence fisheries and prompted disaster declarations by the State of Alaska. The ability to discern the origin of chum salmon early in their migration up the river would be an important advancement for management of the Yukon River chum subsistence fishery, potentially allowing for improved decisions to maintain the health of the stocks. It may also allow for additional subsistence opportunities to help those depending on the chum salmon meet their needs by identifying stocks that are returning in excess of what is needed for escapement.

In addition to their importance to Alaska subsistence users, Yukon chum salmon are of international importance. Representatives of the United States and Canada negotiated for more than 16 years before reaching agreement on the allocation of Yukon River salmon. The DNA analysis technique can help identify the proportions of U.S. and Canada fish in the main stem of the river. Having a tool that identifies the origin of salmon would help managers meet the negotiated allocations.

This study, conducted by the U.S. Fish and Wildlife Service, Conservation Genetics Laboratory., is funded by the Office of Subsistence Management through the Fisheries Resource Monitoring Program. The study is scheduled to be completed in 2006. Reports on other studies funded through the Monitoring Program are available at http://alaska.fws.gov/asm/fisreports.cfm